

**Official Amendment**

Serial No. - 10/038,274

Docket No. - UVD 0280 PA / 40815.324

REMARKS

Claims 1, 3-8, 10-48, 123-124, 126-128, 130-132, 135-148, and 151-154 were pending in the present application. Claims 123, 126, 130, 135, 141-142, and 151 have been amended. As a result of this amendment, claims 1, 3-8, 10-48, 123-124, 126-128, 130-132, 135-148, and 151-154 remain pending. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

The Office Action Summary indicates that claims 152-154 are rejected. Applicants believe that this is erroneous because paragraph 3 under Allowable Subject Matter states that claims 152-154 are allowed.

The rejection of claims 123-124, 126-128, 130-132, 135-148 and 151 under 35 U.S.C. § 112, second paragraph as being indefinite is respectfully traversed. The examiner indicated that the meaning of "preparative agent" in claims 123 and 151 is not clear. The test for definiteness is whether those skilled in the art would understand what is claimed when the claim is read in light of the specification. MPEP 2173.02. The specification explains that the preparative agent is any material that removes preexisting surface oxides and provides a bare metal surface on which to deposit the conversion coating. The breakup and dissolution of the surface oxide in solution produces a bare unprotected metal suited for controlled oxidation, textures the surface, and encourages precipitation of the conversion coat compounds at the metal surface by locally raising the solution pH. The specification also states that preparative agents are called "activators" or "surface etchants" in hexavalent chromium formulations. The specification provides an extensive discussion of numerous suitable preparative agents. P. 15, line 18 to p. 18, line 2, and p. 297, line 6 to p. 300, line 7, and Table 5. Applicants submit that, based on the discussion in the specification, the term "preparative agent" would be understood by one of ordinary skill in the art, and that it is not indefinite.

The examiner also stated that the term "sparingly soluble" was indefinite because the level of solubility encompassed by the term is not clear. However, the specification discusses

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the meaning of the term “sparingly soluble” at length. The specification explains the problems of materials where the solubility is too high and where it is too low. It provides guidelines for solubility, and explains how the solubility can be controlled using substituents on organic valence stabilizers and solubility control agents. P. 8, line 11 to p. 9, line 5; p. 10, lines 8-21; p. 19, line 7 to p. 20, line 23; p. 18, line 3 to p. 29, line 19; p. 133, line 37 to p. 135, line 24; p. 283, line 1 to p. 290, line 16; p. 293, lines 4-9. Therefore, one of skill in the art would understand the meaning of “sparingly soluble.”

Applicants respectfully submit that the claims are in compliance with 35 U.S.C. § 112, second paragraph, and request that this rejection be withdrawn.

In paragraph 3, under Claim Interpretation, the examiner stated that “in view of the use of claim terminology, “optionally an oxidizer, optionally a preparative agent, and optionally a solubility control agent” (claim 123, lines 3 and 4, emphasis added by the examiner), claims 123, 124, 126 to 128, 130 to 132, 135 to 140 and 143 to 147 do not require the presence of an oxidizer, a preparative agent nor a solubility control agent while claim 141 does not require the presence of a preparative agent or a solubility control agent and claim 142 does not require the presence of an oxidizing agent or a solubility control agent.” Applicants agree that claim 123, and claims 124, 128, 140, and 143-147, which depend from claim 123, do not require the presence of an oxidizer, a preparative agent, or a solubility control agent. Claim 126 was amended to recite that “the conversion coating bath includes the oxidizer,” and claim 141 was amended to depend from claim 126. Thus, claims 126, 127, and 141 require the presence of the oxidizer. Claim 130 was amended to recite that the “the conversion coating bath includes the preparative agent,” and claim 142 was amended to depend from claim 130. Thus, claims 130-132 and 142 require the presence of the preparative agent. Claim 135 was amended to recite that “the conversion coating bath includes the solubility control agent.” Thus, claims 135-139 require the presence of the solubility control agent.

The rejection of claims 1, 3-8, 10-12, 14, 15, 123, 124, 126, 130-132, 135-148, and 151 under 35 U.S.C. § 103(a) as being unpatentable over Schriever (U.S. Patent No. 5,411,606) is

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respectfully traversed. Schriever teaches a chemical conversion coating solution. The solution includes an aqueous reaction solution containing a soluble cobalt-III hexacoordinated complex.

The examiner attempted to distinguish this rejection from previously issued rejections. The examiner stated that "[b]elow in this Office Action the Examiner rejects some of the claims in view of Schreiver. At first glance this rejection may appear to be the same as the rejection set forth in the Office actions mailed March 16, 2004 and February 17, 2005 based on the admitted known prior art. . . . However, the rejection set forth in this Office action is based specifically on Schreiver, which is one of the 15 references discussed on pages 5 to 7 of the specification." However, in the rejection under Claim Rejections - 35 U.S.C. § 103, number 2, the examiner quoted from the discussion in the specification of Schreiver in the current rejection, which was the basis for the earlier rejections. Thus, Applicants believe this rejection is the same as those in the earlier Office actions, which were previously overcome. Therefore, Applicants believe that this rejection is improper and respectfully request that it be withdrawn.

In any event, the claims would not have been obvious to one of ordinary skill in the art over Schreiver and Applicant's discussion at pages 5-7.

According to the examiner, "Schriever teaches a corrosion inhibiting conversion coating bath consisting essentially of a solvent, and a cobalt-III hexacarboxylate complex. The cobalt-III hexacarboxylate complex solution is formed by dissolving and reacting a metal carboxylate salt and a soluble cobalt-II salt to form the cobalt-III hexacarboxylate complex containing solution (column 2, line 67 to column 3, line 12). The metal carboxylate salt is used by Schriever to prevent valence shift (column 6, line 60 to column 7, line 10) and therefore is considered to be encompassed by the valence stabilizer recited in applicants' claims. The resulting cobalt-III hexacarboxylate complex is considered to be encompassed by the claim language, "cobalt/valence stabilizer complex" recited in the instant claims." After quoting from the specification at p. 5, line 27 to p. 6, line 6, the examiner further stated that "Applicants' admissions include the limitations of claims 1, 3 to 8, 10 to 12, 14, 15, 123, 124, 126, 130 to 132,

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135 to 148 and 151. Applicants' admissions of the known prior art render the instant claims obvious."

However, contrary to the examiner's position, neither Schriever nor Applicants' admissions render the claimed invention obvious. Claims 1 and 148 recite that the cobalt and valence stabilizer are "combined to form a cobalt/valence stabilizer complex within the solid corrosion-inhibiting conversion coating." The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection.

The general concept of valence stabilization of cobalt *in solution* was known. However, a trivalent or tetravalent cobalt/valence stabilizer complex incorporated in a *solid film* for corrosion inhibition is novel.

Schriever is directed to "stabilizing" the trivalent oxidation state of cobalt while it is in *aqueous solution*, e.g., to increase the bath life, etc. It does not teach or suggest the functionality of trivalent or tetravalent cobalt within a *solid, corrosion-inhibiting conversion coating formed on a substrate metal*. In fact, stabilizing trivalent cobalt *in solution* does not necessarily produce an effective *solid, corrosion-inhibiting cobalt conversion coating*. In the majority of cases, adding stabilizers to the bath is actually detrimental to the coating formed due to solubility differences.

As noted on page 5 of the present application, Schriever uses additives called "bath stabilizers." These chemical species form more stable coordination bonds with trivalent cobalt cations than with divalent cobalt cations in an *aqueous conversion coating solution*. Specifically, carboxylates are described as being added to the *bath* to retain trivalent cobalt in *solution* and to stabilize concentrations during the coating process. However, unlike the present invention that is directed to maintaining oxidized cobalt (i.e., trivalent and/or tetravalent cobalt) in a *solid, corrosion-inhibiting conversion coating formed on a substrate metal*, the prior art bath stabilizers only treat and extend the service life of the trivalent cobalt in the *conversion coating solution*.

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Moreover, in contrast to the present application, “bath stabilizers” used in the manner of Schriever reduce the formation and precipitation of trivalent cobalt-containing solids during coating deposition. Bath stabilizers behave similar to masking agents for chemical gravimetric analysis to keep unwanted compounds from precipitating, and actually serve to starve the deposited coating of trivalent cobalt by shifting the equilibrium away from the formation of a solid, corrosion-inhibiting conversion coating containing trivalent cobalt on the metal surface, to the trivalent cobalt remaining dissolved in the coating bath (see comparative example 2 on pages 313-314). The compounds formed from the solutions of Schriever have lower structural stability in the coating, as well as higher aqueous solubility, than if no bath stabilizer were used at all. The solubilities of the formed compounds are too high to afford long-term corrosion protection. Thus, Schriever does not teach or suggest the solubility of the cobalt/valence stabilizer complexes of claims 1 or 3, or the “sparingly soluble” cobalt/valence stabilizer complexes of claims 148 and 151.

Stabilizing the valence of the ion in *aqueous solution* does not suggest its application in the *solid film*. The idea of using valence stabilized high oxidation state cobalt incorporated into a solid film for corrosion inhibition is unique.

The examiner also stated that “with respect to the properties recited in claims 3 to 7, 12, and 140 to 143, including solubility, the electrostatic barrier, the ion exchange property, the thickness of the coating (i.e., the coating resulting from the contact with the substrate), the cavity containing cobalt and an additional ion are all inherent properties necessarily present from the presence of the same claimed chemicals, namely the trivalent cobalt complex that has been combined with a ligand (i.e. a valence stabilizer).” However, the presence of a stabilized cobalt compound in *solution* in Schriever is not the same as a cobalt/valence stabilizer complex within the *solid corrosion-inhibiting conversion coating*. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection, characteristics which are not inherent

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in Schriever which does not teach or suggest a cobalt/valence stabilizer complex within the *solid corrosion-inhibiting conversion coating*.

With respect to claims 10 and 11, Schriever does not teach or suggest inorganic valence stabilizers or the specific inorganic valence stabilizers recited in claims 10 and 11.

With respect to claim 12, Schriever does not teach or suggest a cobalt/valence stabilizer complex with a central cavity containing a cobalt ion and an additional ion. As discussed on p. 134, line 25 to p. 135, line 20, the central cavity of the heteropolymetallates can contain an ion in addition to cobalt. Examples include silicomolybdates, phosphomolybdates, silicotungstates, and phosphotungstates. In these complexes, the central cavity contains a  $\text{Si}^{+4}$  or  $\text{P}^{+5}$  ion in addition to the cobalt ion. The molybdenum or tungsten is not in the central cavity; rather, it forms the central cavity. Schriever does not teach or suggest such an arrangement.

Claims 123 and 151 have been amended to recite that the organic valence stabilizer is not a carboxylate. Support for these amendments can be found at p. 5, line 23 to p. 7, line 6. Schriever teaches the use of carboxylates as the complexing agent.

With respect to claims 126, 127, and 141, Schriever does not teach or suggest the use of an oxidizer, the specific oxidizers of claim 127, or the concentration of oxidizer in claim 141.

With respect to claims 132, and 142, Schriever does not teach or suggest the use of the specific preparative agents of claim 132, or the concentration of preparative agent in claim 142.

With respect to claims 135-139, Schriever does not teach or suggest the use of a solubility control agent, or the specific solubility control agents of claims 136-139.

With respect to claim 143, Schriever does not teach or suggest the claimed ratio of valence stabilizer to cobalt.

Therefore, claims 1, 3-8, 10-12, 14-15, 123-124, 126, 130-132, 135-148, and 151 would not have been obvious to one of ordinary skill in the art at the time the invention was made.

Applicants gratefully acknowledge the allowance of claims 152-154.

Applicants gratefully acknowledge the examiner's statement that claims 13 and 16-48 would be allowable if rewritten in independent form including all the limitations of the base

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claim and any intervening claims. This was not deemed necessary in view of the arguments made herein.

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CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1, 3-8, 10-48, 123-124, 126-128, 130-132, 135-148, and 151-154 be passed to allowance.

If the Examiner has any questions or comments regarding the present application, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,  
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